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STUDIES IN THE GENUS JASMINUM, II
THE SPECIES FROM NEW CALEDONIA AND THE LOYALTY ISLANDS *

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EXAMINATION OF THE EXTENSIVE MATERIAL of the family Oleaceae collected on the Franco-Swiss Botanical Expedition to New Caledonia, 1950–1952, and generously sent on loan from the Botanic Garden and Museum of the University of Zürich, soon indicated the need for a revision of the species of *Jasminum* recorded from New Caledonia. Even though Guillaumin published a key to the species as recently as 1948 in his *Flore de la Nouvelle-Calédonie* (p. 283), it soon became apparent that some species required reconsideration; and, in addition, two further species, *J. linearifolium* and *J. velutinum*, had been described since 1948. In this revision I have attempted to see as wide a range of material as possible, and although I have not seen all the specimens cited by Guillaumin in his numerous and valuable "Contributions to the Flora of New Caledonia," I have been enabled to examine the types of all the taxa concerned.

When considering specific delimitation in *Jasminum*, as in many genera, it is important to bear in mind the phenomenon of heterostyly. This was recorded in *Jasminum* as early as 1867 (Kuhn, Bot. Zeit. Leipzig **25**: 67), but unfortunately it appears to have been overlooked by Guillaumin in his studies of the New Caledonian species. *Jasminum artense* and *J. dzumacense* are separated in the key just mentioned by the relative positions of the anthers and style: the former with the anthers borne in the upper part of the corolla tube above the style and the latter with the reverse condition. Ignoring this as a specific distinction here, it becomes clear there are not two species but only one. The relative positions of the anthers and styles are mentioned in two or three other places in the key as well, and, in 1914, Guillaumin described a variety of *J. elatum* which he called *brevistylis*, based as it was upon the short or "thrum" condition of the style.

* Results of the Botanical Expedition to New Caledonia 1950–52 (French-Swiss Mission). "Studies in the Genus *Jasminum*, I: Section *Alternifolia*" was published in Notes Bot. Gard. Edinb. **23**: 355. 1961.

The immediate affinities of most, if not of all, species included in this revision lie with others outside New Caledonia, so it is not possible to arrange them in strict order of their suspected relationships. A rough grouping has been attempted, however, and, where two species are thought to be close enough in affinity, e.g., *Jasminum artense* and *J. linearifolium*, they have been arranged together.

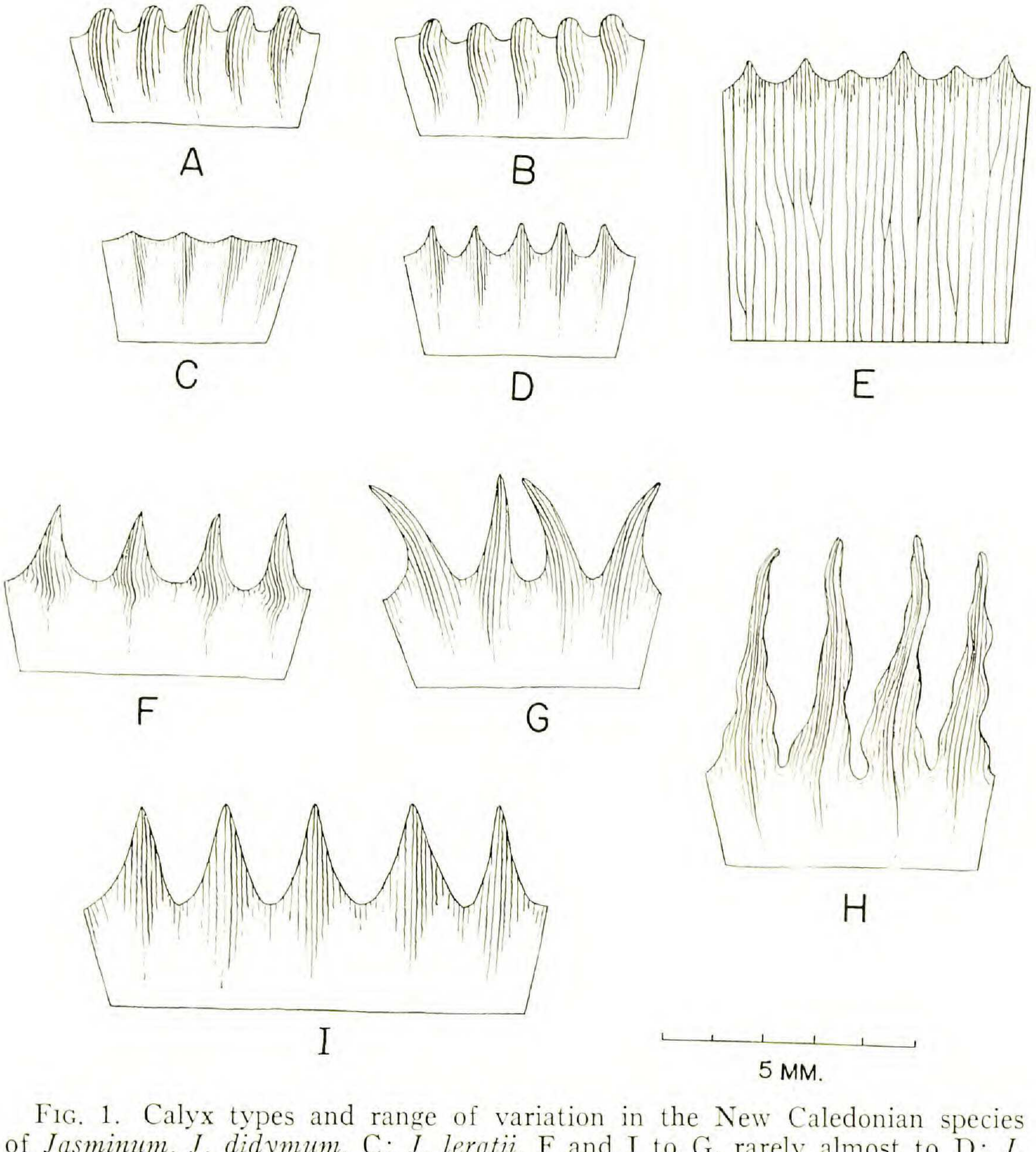

FIG. 1. Calyx types and range of variation in the New Caledonian species of *Jasminum*. *J. didymum*, C; *J. leratii*, F and I to G, rarely almost to D; *J. neocaledonicum*, G; *J. noumeense*, H; *J. artense*, C to D; *J. linearifolium*, C; *J. elatum*, A and B to, occasionally, almost C; *J. promunturianum*, A; *J. kriegeri*, E. (A drawn from *Pancher 316*; B, *Däniker 2270*; C, *Vieillard 913*; D, *Däniker 483*; E, *Vieillard 2937*; F, *Däniker 3089*; G, *Schlechter 15586*; H, *Pancher 315*; I, *Däniker 1333*).

It is perhaps significant that three out of the nine species are only known from a single collection. Furthermore, additional exploration may well indicate what can only be suspected at present; that *Jasminum lineari-*

folium may not be separable at specific rank from *J. artense* and that *J. promunturianum* is equally close to *J. elatum*. The calyces of these species, as pairs, appear identical, and in *Jasminum* the shape and dimensions of the calyx and its teeth, although somewhat limited in the possibilities of their variation, often give convenient characters for identification and a strong indication of affinities. *Jasminum kriegeri*, on the other hand, known only from the one somewhat scrappy specimen collected almost one hundred years ago, has a distinctive calyx. FIGURE 1 gives a diagrammatic representation of the calyces and their range of variation in the species under review.

Two alien species widely grown in the tropics throughout the world have been recorded from New Caledonia, and it is suspected that they have established themselves as escapes from cultivation. They are *Jasminum sambac* (L.) Ait. (see Guillaumin, Ann. Mus. Col. Marseille II. 9: 191. 1911; Bull. Mus. Hist. Nat. Paris 25: 500. 1919; Not. Syst. Paris 3: 61, 65. 1914; and Fl. Nouv.-Caléd. 284. 1948) and *J. multiflorum* (Burm. f.) Andr. (as *J. pubescens* (Retz.) Willd.; see Guillaumin and Virot, Mém. Mus. Hist. Nat. Paris II (B). 4: 48. 1953).

One or two native names are recorded for various species. From the Island of Lifou (Loyalty Islands) the name "queku" is noted for *Jasminum elatum* on the label of *Deplanch 82* (P) and the name "wechu" is reported by Däniker (Viert. Naturf. Ges. Zürich 78(Beibl. 19): 386. 1933) as being given to *J. didymum*, *J. elatum*, and *J. leratii* (as *J. simplicifolium*). From the adjacent Island of Maré, Däniker records the name "wekutsch" for *J. didymum* and *J. leratii* and Baumann-Bodenheim (*14770*) "wawekuce" for *J. didymum*. It would seem that these are general names for jasmines as a whole. Guillaumin (Candollea 5: 151. 1932) quotes information from Bergeret, who had lived in the Loyalty Islands and knew the language, that on Lifou the name "wexu tremanji" is used for *J. leratii* and "wexu foë" for *J. elatum*.

I should like to express my grateful thanks and appreciation to the directors and curators of the cited herbaria for the loan of material or facilities for study. All material cited has been examined, and the respective herbaria are indicated by the abbreviations published in *Index Herbariorum*, Ed. 4, 1959. I should particularly like to mention Dr. Alicia Lourteig, of Paris; Dr. H. Hürlimann, of Basle; and Dr. H. A. Stauffer, of Zürich, to whom I am much indebted for their kind help and cooperation, and Miss Judith Kroll to whom I owe the drawings of calyces.

KEY TO SPECIES

1. Leaves trifoliolate; corolla tube up to 12 mm. long and lobes up to 2.5 mm. long. ..... 1. *J. didymum*.
1. Leaves simple; corolla tube more than 12 mm. long (rarely as short as 8 mm. in *J. elatum*) and lobes more than 4 mm. long.
   2. Calyx teeth distinct, more than 1 mm. long (FIG. 1, F–I).

3. Teeth of calyx narrowly lanceolate to subulate-filiform, up to 3 mm. long, usually less (FIG. 1, F to G or I); corolla tube 10–22 mm. long.
   4. Corolla tube up to 20 mm. long, usually less; leaves usually narrowly ovate but ranging from narrowly lanceolate to broadly ovate, (1–)2.5–5.5(–8) cm. long. ..... 2. *J. leratii.*
   4. Corolla tube 20–22 mm. long; leaves broadly or very broadly ovate, (4–)6–9.5(–11) cm. long. ..... 3. *J. neocaledonicum.*
3. Teeth of calyx lanceolate, subfoliaceous, 2–5.5 mm. long (FIG. 1, H); corolla tube 24–33 mm. long. ..... 4. *J. noumeense.*

2. Calyx teeth short or indistinct, up to 1 mm. long (FIG. 1, A–E).
   5. Leaf length not more than twice the breadth.
      6. Pedicels 5–20 mm. long; leaves usually less than 4 cm. long, rarely up to 5.2 cm., ovate to orbicular, more or less coriaceous, the margin more or less recurved and thickened. .... 5. *J. artense.*
      6. Pedicels 0–2 mm. long; leaves usually more than 4 cm. long, narrowly ovate, or if ovate to broadly ovate then always more than 4 cm. long, more or less chartaceous, the margin not usually recurved or noticeably thickened. ..... 7. *J. elatum.*
   5. Leaf length more than twice the breadth.
      7. Length of leaf more than 3 cm.; leaves linear to narrowly lanceolate, apex obtuse or acute.
         8. Shape of leaf linear, not more than 6 mm. broad; calyx tube 1.25 mm. long. ..... 6. *J. linearifolium.*
         8. Shape of leaf narrowly lanceolate, 6–11 mm. broad; calyx tube 4.5 mm. long. ..... 9. *J. kriegeri.*
      7. Length of leaf up to 2.5 cm.; leaves oblanceolate or narrowly oblanceolate, apex retuse. ..... 8. *J. promunturianum.*

Section TRIFOLIOLATA DC.

1. **Jasminum didymum** Forster fil., Prodr. 3. 1786; De Candolle, Prodr. 8: 311. 1844; Drake del Castillo, Ill. Fl. Ins. Maris Pacif. 231. 1892, et Fl. Polyn. Franç. 120. 1893; Jeanneney, Nouvelle-Calédonie Agricole 121. 1894; Guillaumin, Ann. Mus. Col. Marseille II. 9: 191. 1911, et Bull. Mus. Hist. Nat. Paris 18: 40, 329. 1912; Guillaumin & Beauvisage, Ann. Soc. Bot. Lyon 38: 102 ("Species Montrouzieranae," 28) 1914; Guillaumin, Not. Syst. Paris 3: 61, 65. 1914, et Bull. Mus. Hist. Nat. Paris 25: 291, 652. 1919, et in Sarasin & Roux, Nova Caledonia, Bot. 1: 207. 1921; Moore, Jour. Linn. Soc. Bot. 45: 356. 1921; Guillaumin, Bull. Mus. Nat. Hist. Paris II. 4: 701. 1932; Däniker, Viert. Naturf. Ges. Zürich 78(Beibl. 19): 365. 1933; Guillaumin, Bull. Mus. Hist. Nat. Paris II. 6: 458. 1934, *ibid.* 10: 519. 1938, *ibid.* 14: 455. 1942, et Not. Syst. Paris 11: 55. 1943, et Bull. Mus. Hist. Nat. Paris II. 15: 453. 1943, et Fl. Nouv.-Caléd. 283. 1948, et Mém. Mus. Hist. Nat. Paris II(B). 4: 47. 1953, et Bull. Mus. Hist. Nat. Paris II. 27: 475. 1955, *ibid.* 31: 179. 1959, et Mém. Mus. Hist. Nat. Paris II(B). 8: 161. 1959.

J. divaricatum R. Br. Prodr. 521. 1810; Labillardier, Sert. Austr.-Caled. *t.* 27. 1824–25; Endlicher, Wien Mus. Naturg. Ann. 1: 177. 1836; De

Candolle, Prodr. **8:** 311. 1844; Montrouzier, Mém. Acad. Lyon **10:** 232. 1860; Jeanneney, Nouvelle-Calédonie Agricole, 121. 1894; Schlechter, Bot. Jahrb. **39:** 231. 1907; Guillaumin, Not. Syst. Paris **11:** 55. 1943.

J. didymum var. *stenophyllum* Däniker, Viert. Naturf. Ges. Zürich **78**(Beibl. 19): 366. 1933.

J. fitzgeraldii Knobl. ex Guillaumin, Bull. Mus. Hist. Nat. Paris II. **14:** 456. 1942, nomen pro syn.

Evergreen climber; stems puberulent, often minutely so, or more rarely glabrous. *Leaves* opposite, trifoliolate; common petiole 7–17(–22) mm. long, terminal petiolule (2–)4–12 mm. long, the lateral (1–)2–10 mm. long, puberulent, especially in the groove above, or glabrous; lamina thickish or more or less chartaceous, leaflets narrowly ovate, to narrowly lanceolate (or ovate) or more or less elliptic to narrowly elliptic, the terminal leaflet (0.8–)2–7(–9) cm. long by (0.4–)0.8–3.5(–7) cm. broad, the lateral (1–)1.5–5(–7) cm. long by (0.3–)0.6–2.5(–3.5) cm. broad; margin entire, sometimes slightly thickened, often slightly recurved; apex rounded, obtuse or acute, often with an apiculus or the remains of one; base rounded, subcordate or acute, not attenuate into the petiolule; venation more or less visible as a reticulation, with 4 or 5 (6) primary veins per side. *Inflorescences* axillary or terminal on side shoots, a contracted ternately branched panicle, with few to many flowers, puberulent or glabrous; bracts triangular-lanceolate or subulate, 0.5–2 mm. long; pedicels 0.5–1.5 (–2) mm. long. Flowers white, fragrant, heterostylous. *Calyx* glabrous, occasionally slightly puberulent towards the base, the tube 1.5–2 mm. long with 4–6 often obscure teeth 0–2.5 mm. long (Fig. 1, C), usually slightly ciliolate. *Corolla* hypocrateriform, tube 5–8(–10.5) mm. long, the lobes 4–7, ovate or broadly ovate, rounded to acute, 1.75–3 mm. long. *Stamens* 2, the anthers 2–3.5 mm. long, on filaments 0.5–1 mm. long. *Ovary* 0.75–1 mm. long, with style 2–2.5 mm. long in short-styled flowers or about 5 mm. long in long-styled. *Fruit* not seen in New Caledonian material.

New Caledonia. Gatope, *Vieillard 913* (A, E, GH); montagnes de Gomouen près Gatope, *Vieillard 2935* (BM, K); M'bée, *Vieillard 2936* (K); superieur de Koumac, *Balansa 2785* (E, K); im Tale der Koumac, am Weg von Koumac nach Ouegona, bei den Kalk Klippen, im Gëhölz am Bache, 23 May 1925, *Däniker 1717* (Z); Baie Banaré, *Balansa 3189* (BM, E, K); buissons, La Coulée, 28 March 1928, *Franc 2313* (A, US); bois de Port-Despointes (Nouméa), ±50 m. alt., bois secs des collines littorales, schistes nummulitiques, 21 Nov. 1942, *Virot 846* (A), *ibid.*, ± 40 m. alt., 6 Dec. 1942, *Virot 882* (A); Anse Vata, *Brousmiche 577* (A); Anse Vata, low calcareous hill, 23 Apr. 1955, *McKee 2428* (HULL, US); Oundjo, 1958, *McKee 6512* (HULL); bords de la Dumbéa, 50 m. alt., 6 June 1909, *Franc 1377* (NY); trail from Dumbéa towards Mt. Dzumac, 650 m. alt., mesophilous forest on serpentine soil, 28 Mar. 1951, *Hürlimann 1092* (A, Z); slope south of Paoué valley (Tipindjé), 500 m. alt., meso-xerophilous forest on rocky serpentine soil, 13 Apr. 1951, *Hürlimann 1166* (A, Z); upper Tipindjé valley, 150 m. alt., mesophilous forest on serpentine soil, 23 Apr., 1951, *Hürlimann 1307* (A, Z); base of Ouen Toro near Nouméa, 10 m. alt., dry forest on calcareous soil, 27 July 1950, *Baumann-Bodenheim 5032* (A, Z),

17 Sept. 1950, *Baumann-Bodenheim 6057* (A, Z), and 14 Oct. 1950, *Guillaumin & Baumann-Bodenheim 6842* (A, Z); Mt. Kouvelée (Dumbéa), forest on serpentine soil, 9 May 1951, *Guillaumin & Baumann-Bodenheim 13127* (A, Z); Mt. Kaféaté, 19 May 1951, *Guillaumin 13395* (A, Z); Mt. Mou, gully forest, serpentine, 450 m. alt., 1914, *Compton 455* (BM); bei Hieghène, Apr. 1921, *Heim 74* (Z): Tiebaghikuppen, am Nordostabhang, auf Serpentin, im Gebüsch auf Steinen, oft und verbreitet, 14 Mar. 1924, *Däniker 1436* (holotype, var. *stenophyllum*, Z).

ISLE OF PINES: *Le Rat 109* (K); near Kuto, on coral soil, 26 May 1951, *Baumann-Bodenheim 13454* (A, Z); Anse Kanumera, on coral soil, 27 May 1957, *Baumann-Bodenheim 13608* (Z); Kouibandiou Island, near Isle of Pines, *Araucaria cookii-Pandanus* forest on coral soil, 25 May 1951, *Baumann-Bodenheim 13436* (Z).

Loyalty Islands. LIFOU: Mou, oft an den felsigen Abhängen der Ostküste, 29 Nov. 1925, *Däniker 2465* (Z); Natalo, im Buschwalde, 2 Nov. 1925, *Däniker 2465a* (Z); Képénéé, in Wald, 17 Apr. 1912, *Sarasin 730* (Z). OUVÉA: May 1912, *Sarasin 890* (Z). MARÉ: Pénélo, on coral soil, 18 July 1951, *Baumann-Bodenheim 14770* (A, Z).

Easily distinguished amongst the jasmines of New Caledonia by its trifoliolate leaves, this species is nevertheless very variable. The variability is most obvious in leaflet size and breadth but also in corolla size, although the corolla tube and lobes are always smaller than in any of the other species. In 1933, Däniker described his variety *stenophyllum* based upon a small, narrow-leafletted variant (*Däniker 1436*) but, to judge from the considerable number of specimens I have examined, it falls into the range of the apparently continuous variation exhibited by the species. It is worth noting, too, that *Virot 846*, with leaflets similar to and perhaps a little narrower than *Däniker 1436*, is said, in the field notes on the label with the specimen, to be a "forme jeune", but I have no knowledge to what extent leaflet shape and size may vary with maturity. The name "*Jasminum fitzgeraldii*" attached by Knoblauch to the specimen of *Däniker 2465* at Zürich was never validly published, and Guillaumin, when drawing attention to the variability of *J. didymum* (in Bull. Mus. Hist. Nat. Paris II. 14: 455. 1942), remarks that it is only an intermediate between the linear-leafletted expression, as exemplified in the extreme by *LeRat 1610* (not seen, also mentioned by Guillaumin in *ibid.* 6: 458. 1934) and the almost orbicular-leafletted *Vieillard 2935*.

Jasminum didymum lies within a complex distributed over the Australasian and Malaysian areas; a complex which calls for investigation and treatment as a whole, with geographical distribution as only one of the characters taken into consideration. *Jasminum didymum* was the first species described in this complex; in addition to *J. divaricatum* R. Br., described from Australia and included in the synonymy above, the other species are: *J. dallachii* F. Muell. (Australia), *J. degeneri* Kobuski (Fiji), *J. domatiigerum* Lingelsh. (New Guinea), *J. gilgianum* K. Schum. (New Guinea), *J. lineare* R. Br. (Australia), *J. micranthum* R. Br. (Australia), *J. parviflorum* Decne. (Timor), *J. racemosum* F. Muell.

(Australia), *J. rupestre* Blume (New Guinea), *J. smithianum* Kobuski (Fiji), and *J. triphyllum* Merrill (Philippine Is.).

It appears that *Jasminum didymum* may exhibit a certain amount of androdioecism, for, despite the examination of several flowers, no styles have been found on some specimens (for example, *Franc 2313* and *Vieillard 913*), and the ovary, whilst normal in size, is presumably abortive. The anthers however, were normal and full of pollen. In other specimens both the style and stamens were normal, although exhibiting heterostyly.

Section UNIFOLIOLATA DC.

2. **Jasminum leratii** Schlechter, Bot. Jahrb. **40**(Beibl. 92): 32. 1908; Guillaumin, Ann. Mus. Col. Marseille II. **9**: 191. 1911, et Not. Syst. Paris **3**: 62. 1914, et Bull. Mus. Hist. Nat. Paris II. **6**: 458. 1934, *ibid.* **13**: 476. 1941, *ibid.* **15**: 454. 1943, et Fl. Nouv.-Caléd. 284, 1948, et Mém. Mus. Hist. Nat. Paris II(B). **4**: 47. 1953, et Bull. Mus. Hist. Nat. Paris II. **27**: 327, 475. 1955.

J. francii Guillaumin, Bull. Mus. Hist. Nat. Paris II. **5**: 323. 1933.
J. neocaledonicum Schlechter var. *angustifolium* Däniker, Viert. Naturf. Ges. Zürich **78**(Beibl. 19): 366. 1933.
J. daenikeri Knoblauch, Repert. Sp. Nov. **41**: 150. 1936.
J. paagoumenum Knoblauch, Repert. Sp. Nov. **41**: 150. 1936.
J. absimile L. H. Bailey, Gent. Herb. **4**: 346. 1940, Hortus Second 397. 1941, et Man. Cult. Pl. ed. 2. 797, 798. 1949: P. Riedal (Calif. Arboretum Foundation), Pl. for Extra-Trop. Regions 335. 1957.
J. noumeense Schltr. var. *microphyllum* Guillaumin, Bull. Mus. Nat. Paris II. **15**: 454. 1943.
"*J. simplicifolium* Forst. f." sensu Guillaumin, Ann. Mus. Col. Marseille II. **9**: 192. 1911, et Not. Syst. Paris **3**: 62, 65. 1914, et Bull. Mus. Hist. Nat. Paris **25**: 652. 1919, et in Sarasin & Roux, Nova Caledonia, Bot. **1**: 207. 1921; Moore, Jour. Linn. Soc. Bot. **45**: 356. 1921; Guillaumin, Candollea **5**: 151. 1932; Däniker, Viert. Naturf. Ges. Zürich **78**(Beibl. 19): 368. 1933; Guillaumin, Bull. Mus. Hist. Nat. Paris II. **5**: 323. 1933; *ibid.* **6**: 458. 1934, *ibid.* **15**: 454. 1943, et Fl. Nouv.-Caléd. 284. 1948.
"*J. australe* Pers." sensu Montrouzier, Mém. Acad. Lyon **10**: 231. 1866; Guillaumin & Beauvisage, Ann. Soc. Bot. Lyon **38**: 123 ("Species Montrouzieranae," 49) 1914.

Evergreen diffuse shrub, climber, or liane of variable length; the stem glabrous or minutely puberulent, especially when young. *Leaves* opposite, simple; petioles 1.5–10(–20) mm. long, glabrous or minutely puberulent, articulated ¼ to ½ way from base; lamina more or less chartaceous, (broad ovate to) ovate to lanceolate (to linear lanceolate), (1–)2.5–5(–8) cm. long by (0.4–)1.5–4(–5) cm. broad; margin entire, not or scarcely thickened, rarely slightly recurved; apex obtuse or acute, sometimes more or less rounded or apiculate; base rounded or obtuse, sometimes more or less truncate or acute or even angustate, often slightly attenuate into the petiole; venation more or less obscure or reticulate or with primary veins

only visible above and below, 3–5(6) per side, the upper 3 or 4 often anastomosing towards the margin. *Inflorescences* terminal on side shoots or axillary, ternately paniculate with 3–9(–18) flowers per panicle, glabrous or minutely puberulent; bracts linear-filiform, 1–4 mm. long or occasionally approaching foliaceous and slightly longer; pedicels 2–20 mm. long. Flowers white, feebly to strongly fragrant, heterostylous. *Calyx* glabrous or minutely puberulent, tube (1.5–)2–2.5(–3) mm. long with 4–6, triangular-lanceolate teeth, (0.5–)2–3.5(–4) mm. long (FIG. 1, ranging from G, through I and F, to rarely almost D), more or less accrescent in fruit. *Corolla* hypocrateriform, tube 11–20 mm. long, lobes 5–7, lanceolate or narrowly lanceolate, acute, 7–12 mm. long. *Stamens* 2, anthers 3–4.75 mm. long on filaments 0.5–2 mm. long. *Ovary* 1–1.25 mm. long, style 3–6.5(–9) mm. long in short-styled flowers or 11–16 mm. long in long-styled. *Fruit* ellipsoid-ovoid, paired (or single by abortion) 6–8 mm. long by 5–6 mm. broad.

New Caledonia. Magenta, Jan. 1903, *Le Rat 172* (isotype, P); Nouméa, *Franc 1544* (syntype *J. francii*, P), *Franc 1544A* (syntype *J. francii* P; isosyntype, A); Port de France (Nouméa), 1855–60, *Vieillard 911* (A, G, K); Port Despointes, 50 m., bois secs des collines littorales, schistes nummulitiques, 6 Dec. 1942, *Virot 876, 881* (A), *ibid.*, 13 Dec. 1942, *Virot 922, 927, 929* (A); Prony, coteaux arides, roches ferrugineuses, 20 Feb. 1914, *Franc 1906* (A, Z); Koné, oft im niederen Gebüsch der Küstenhügel, 11 Feb. 1925, *Däniker 770a, 3088* (Z); an der Mündung des Flusses von Koné, zerstreut im Gebüsche der sumpfigen Flussdeltas, 10 Feb. 1925, *Däniker 1171* (holotype *J. neocaledonicum* var. *angustifolium* & *J. daenikeri*, Z); bei Paagoumen, im Grasbestand auf Serpentingebüsch, 22 March 1925, *Däniker 1518* (holotype *J. paagoumenum*, Z); Ile de la Table, bei Koumac, in Acaciengebüsch, 5 March 1925, *Däniker 1333, 1335* (Z); auf der Insel Neba, im Sumpfwäldchen bei dem Teiche, 8 April 1925, *Däniker 1599* (Z); am Anse longue bei Carticaté, St. Vincent, im Ufergehölz, 12 Dec. 1924, *Däniker 770* (Z); Anse Vata, low calcareous hill, remnant of dry forest with trees close together, 23 Jan. 1955, *McKee 1973* (A, HULL, US), *475* and *2342* (HULL); slope of Ouen Toro, 22 March 1955, *McKee 2251*, (A, US); Ouen Toro, promenade Pierre Vernier, 10 m. alt., climax littoral à *Acacia spirorbis*, nummulitique, terraine schisto-calcaire, 30 Jan. 1941, *Virot 442* (A); N.W. of Mt. Natégou, beneath the road to Yaté, shrubby forest on rocky serpentine ridge, 270 m. alt., 29 Jan. 1951, *Hürlimann 769* (A, Z); "Bois du Sud" (towards the Yaté valley), *Spermolepis* forest on serpentine, 29 March 1951, *Guillaumin & Baumann-Bodenheim 11663* (A, Z); south of Mt. Poindas (Tipindjé), mesophilous forest on serpentine ridge, 520 m. alt., 21 April 1951, *Hürlimann 1290* (A, Z); Mt. Koniambo, on serpentine soil, 21 Dec. 1950, *Guillaumin & Baumann-Bodenheim 9514* (A, Z); Mt. Kaféaté, on serpentine soil, 22 Dec. 1950, *Guillaumin & Baumann-Bodenheim 9665* (A, Z), *ibid.*, on calcareous soil, 10 April 1951, *Guillaumin & Baumann-Bodenheim 12043* (A, Z); Moro Island, on coral soil, 5 & 6 March 1951, *Guillaumin & Baumann-Bodenheim 11106, 11135, 11161* (A, Z); Col de Vulcain, xerophilous forest on serpentine soil, 900 m. alt., 12 Nov. 1950, *Baumann-Bodenheim 8285* (A, Z); Gatope, 1861–67, *Vieillard 2938* (A, G, GH, P) and *2935* (holotype *J. noumeense* var. *microphyllum*, P); Voh, March 1921, *Heim 49* (Z). ISLE OF PINES:

Germain 13 (A); Kuto peninsula, on calcareous soil, 28 May 1951, *Baumann-Bodenheim 13642* (A, Z).

Loyalty Islands. LIFOU: bei Képénéhé, im Buschwalde, 31 July 1925, *Däniker 1886* (Z), *ibid.*, 22 Oct. 1925, *Däniker 2269* (Z), 19 April 1912, *Sarasin 185* (Z); in der Umgebung von Natalo, oft im Gebüsch, 2 Nov. 1925, *Däniker 2388* (Z); zwischen Natalo und Tingeting, in der Savanne zerstreut, 2 Nov. 1925, *Däniker 2388a* (Z); Kiätheng, in der Savanne, 21 Nov. 1925, *Däniker 3089* (Z). OUVÉA: May 1912, *Sarasin 885* (Z); Fayaoué, in den Gebüschen, 4 Aug. 1925, *Däniker 1909* (Z). MARÉ: uberall auf dem Plateau von Maré, 29 Nov. 1911, *Sarasin 424* (Z); Eneni, oft in der inneren Ebene von Maré, besonders längs der Wege, 29 Dec. 1925, *Däniker 2626* (Z); Tadine, forest on coral soil, 12 July 1951, *Baumann-Bodenheim 14529* (A, Z); Rawa, mesophilous forest on coral soil, 17 July 1951, *Baumann-Bodenheim 14721* (A, Z) without locality, Jan. 1908, *Franc 1021* (NY).

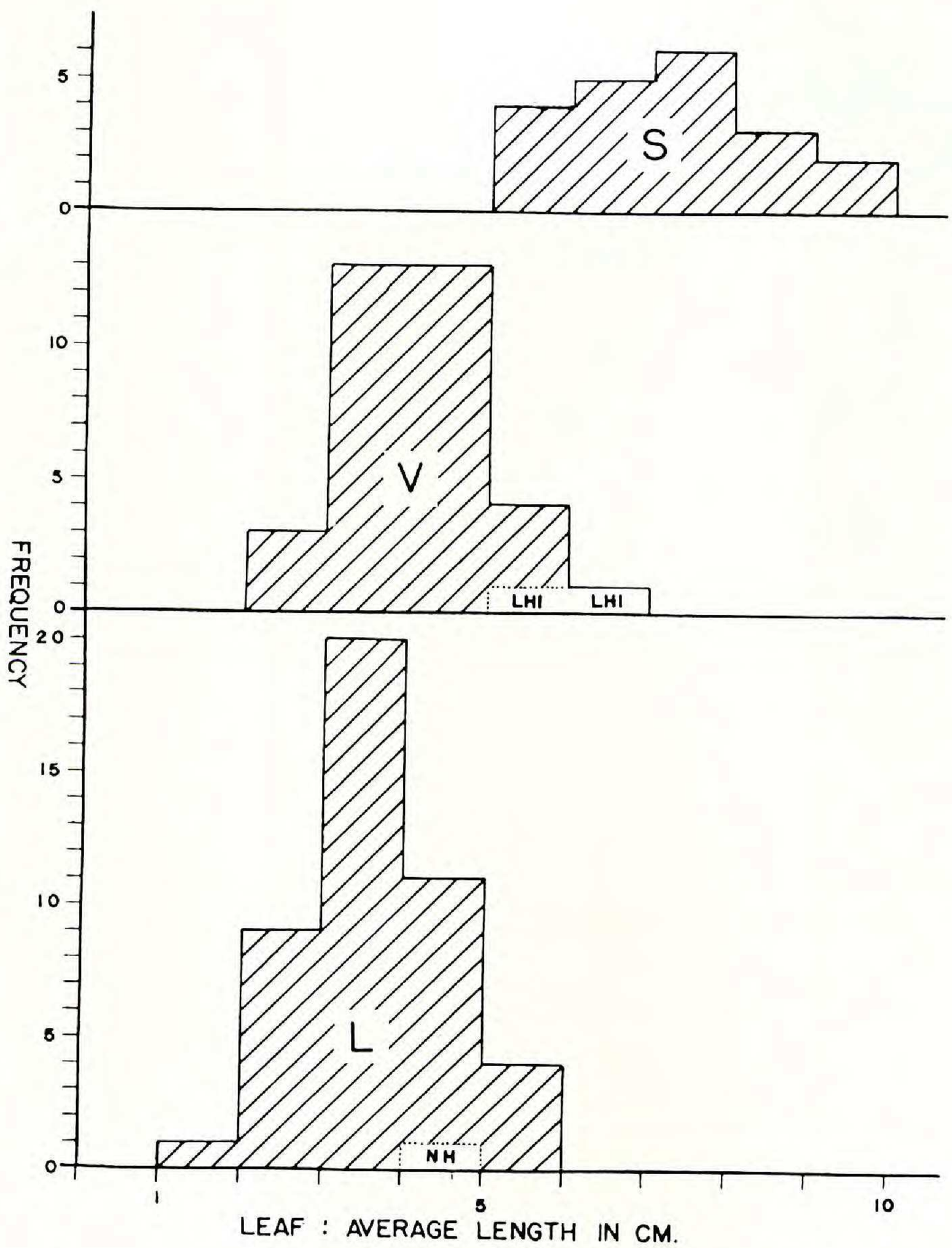

FIG. 2. Frequency histograms of leaf length in *Jasminum leratii* (L), *J. volubile* (V), and *J. simplicifolium* (S). LHI and NH indicate the position of the specimens examined from Lord Howe Island and the New Hebrides respectively.

Cultivated. United States of America, California: Santa Barbara, 27 July 1917, *Eastwood* (A); San Diego, Aug. 1919, *Woodcock 630* (holotype of *J. absimile*, BH); Golden Gate Park, San Francisco, 23 March 1927, *Bailey 9623* (BH); R. Menzie's place, Mill Valley, 24 July 1927, *Walter 65* (A).

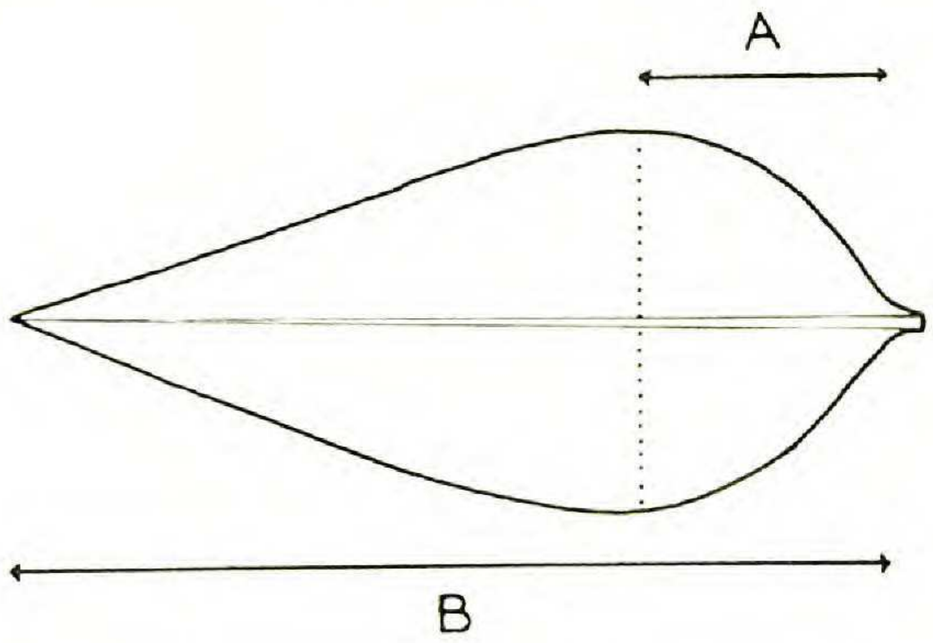

FIG. 3. Greatest leaf breadth factor: measurement B divided by measurement A (see text).

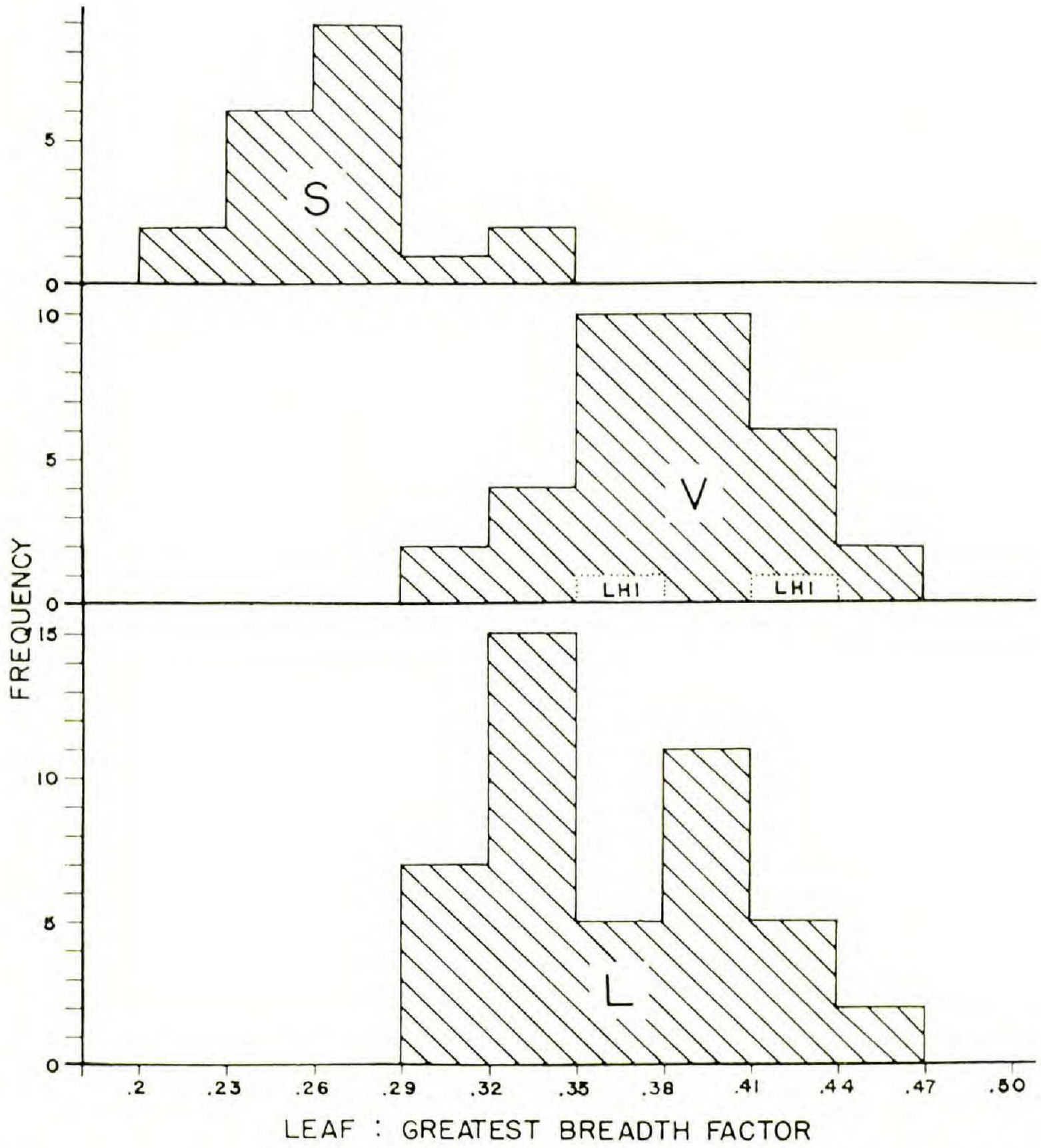

FIG. 4. Frequency histograms for greatest leaf breadth factors in *Jasminum leratii* (L), *J. volubile* (V), and *J. simplicifolium* (S). LHI and NH indicate the position of the specimens examined from Lord Howe Island and the New Hebrides respectively.

A close relationship exists between this species, *Jasminum simplicifolium* Forst. f. and *J. volubile* Jacq. (*J. gracile* Andr.), and, after considerable study of material of all three, I have come to the conclusion that, for the present at least, they should be treated as separate species. Without doubt all three lie very close together and it is not without significance that *J. leratii* was placed as a doubtful synonym under *J. simplicifolium* by Guillaumin in 1921 (in Sarasin & Roux, Nova Caled. Bot. 1: 207. 1921) and later by Däniker (Viert. Naturf. Ges. Zürich 78(Beibl. 19): 368. 1933), although the two were maintained as distinct in Guillaumin's relatively recent *Flore de la Nouvelle-Calédonie* 284. 1948. Bailey (Gent. Herb. 4: 342. 1940) separates *J. volubile* (as *J. gracile*) and *J. simplicifolium* and infers that the former is confined to Australia, an inference supported by this investigation. For this study a careful analysis has been made of leaf length, distance from the base to the greatest breadth of the leaf, length of calyx teeth, length of pedicel, and length of corolla tube; and each has been considered in relation to geographical distribution. The results may be expressed as follows: (i) LEAF LENGTH. The extra-Novo Caledonian *J. simplicifolium* (from Fiji & Tonga) has longer leaves than either *J. leratii* (from New Caledonia) or *J. volubile* (from Australia), although, using the average leaf length of a specimen, a slight overlap occurs around 5.5–6 cm. (FIG. 2). (ii) GREATEST LEAF BREADTH FACTOR. Bailey (*loc. cit.*) indicated the possible value of the position of greatest breadth of the leaf in distinguishing between these species. In this analysis a "greatest leaf breadth factor" was calculated by measuring the total length of a leaf, and dividing by the distance up the midrib to the position of greatest breadth (see FIG. 3; B divided by A). Using this method it was found that *J. simplicifolium* had the lowest factor, less than 0.3 whilst *J. leratii* and *J. volubile* both had factors ranging from 0.3 to 0.45 (FIG. 4). That is to say, *J. simplicifolium* has leaves which have their greatest breadth in the lower third and the other species between the lower third and middle of the leaf. (iii) LENGTH OF CALYX TEETH. *Jasminum volubile* is more or less separable from *J. leratii* and *J. simplicifolium* on this character. In the first species, the teeth range from practically nothing to no more than an average of 0.75 mm. in length, usually less, whilst in the latter two species they vary from an average of just under 0.75 mm. to 2 mm. in *J. simplicifolium* and to nearly 4 mm. in *J. leratii*, which is very variable in length of calyx teeth (FIG. 5). (iv) LENGTH OF PEDICEL. There is no clear cut separation of the taxa on this character but only a very slight tendency for *J. volubile* to have shorter pedicels than the other two species. (v) LENGTH OF COROLLA TUBE. *Jasminum volubile* is distinguishable by its shorter corolla tube which, in the material examined, ranges from about 8 to 11 mm., whereas in *J. leratii* and *J. simplicifolium* (which together seem indistinguishable on this character) it ranges from 11–20 mm. (FIG. 6).

These details may be summarized by saying that *Jasminum leratii* has leaves which are shorter and slightly more elliptical than those of *J.*

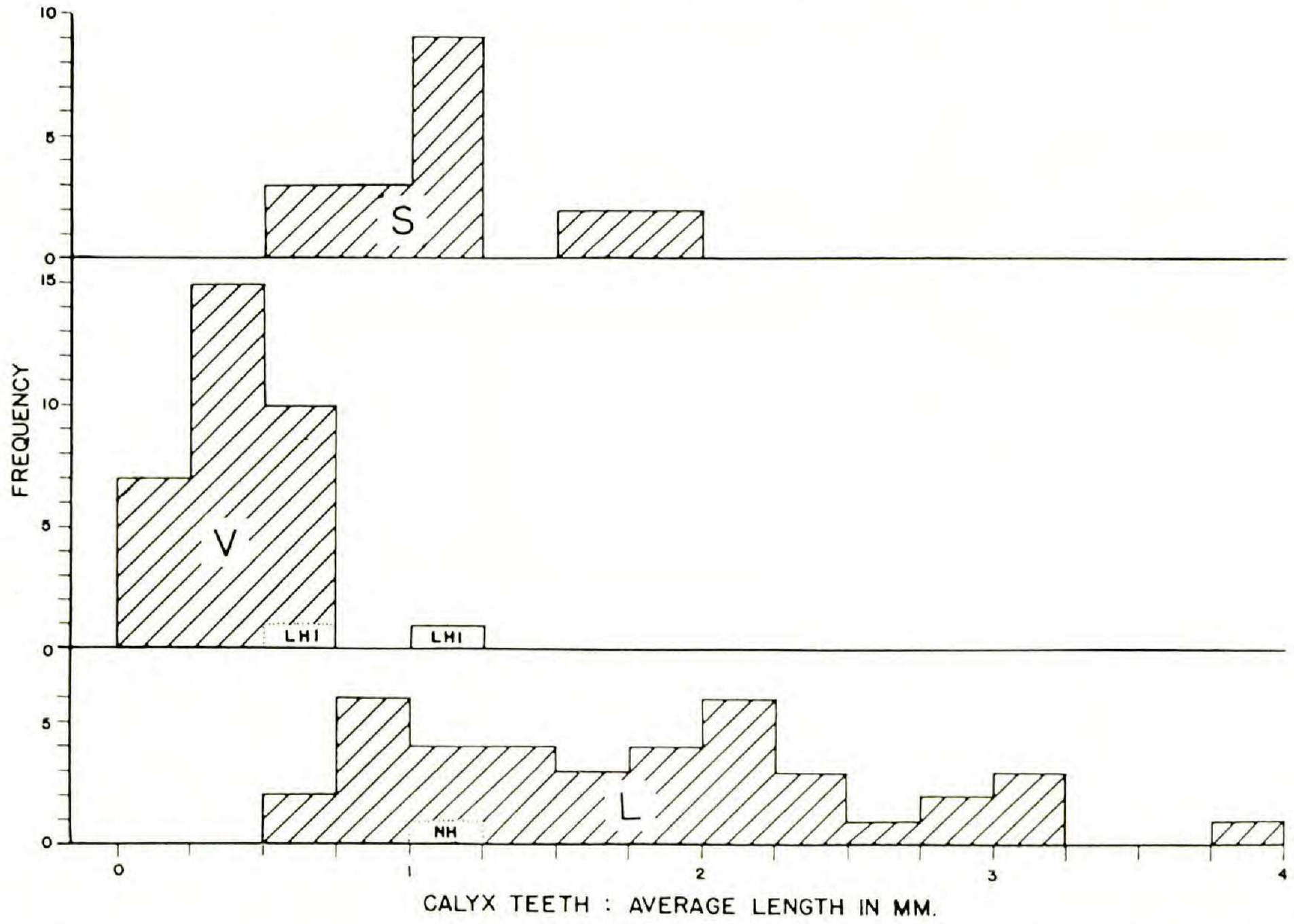

FIG. 5. Frequency histograms for length of calyx teeth in *Jasminum leratii* (L), *J. volubile* (V), and *J. simplicifolium* (S). LHI and NH indicate the position of the specimens from Lord Howe Island and the New Hebrides respectively.

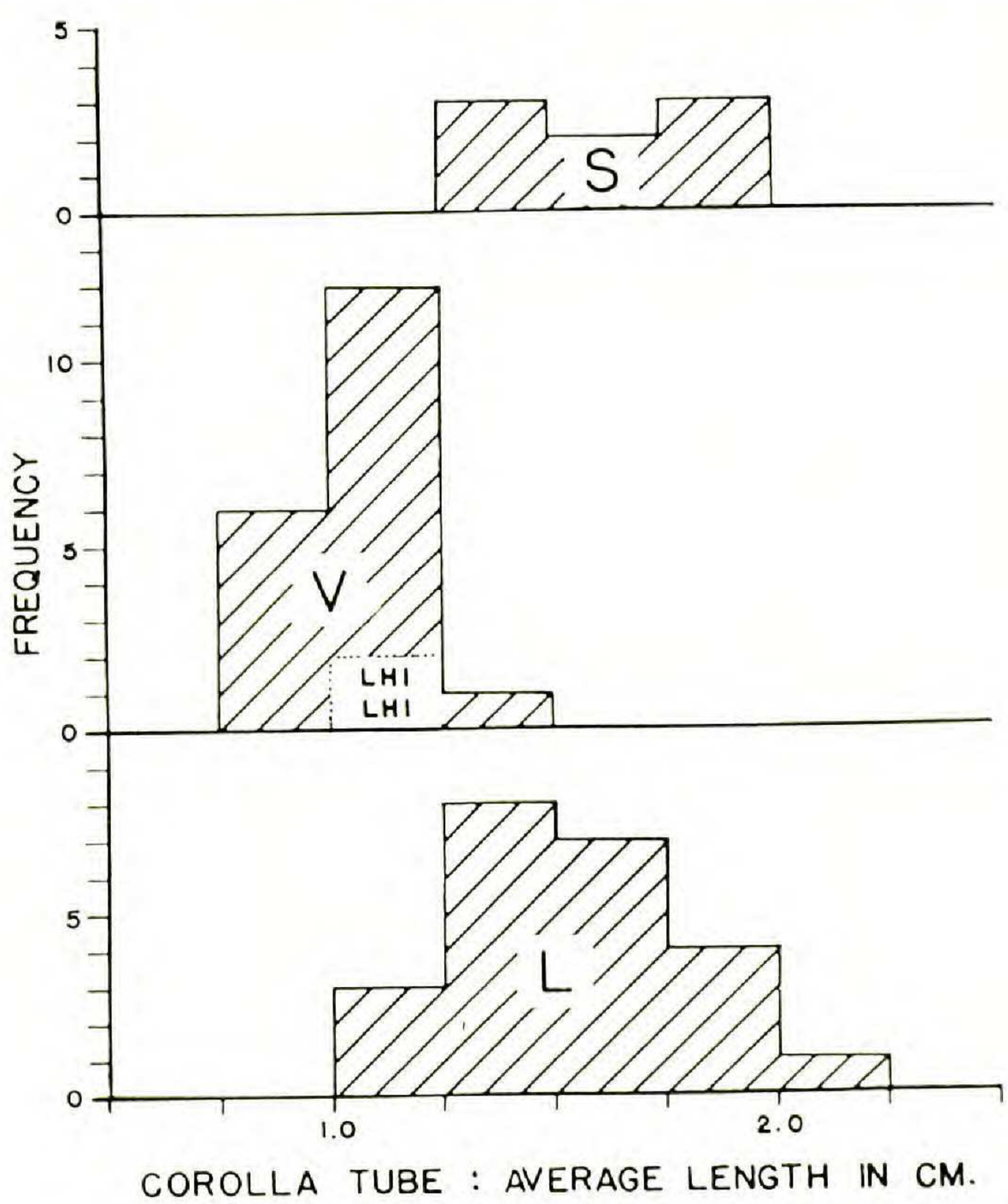

FIG. 6. Frequency histograms for length of corolla tube in *Jasminum leratii* (L), *J. volubile* (V), and *J. simplicifolium* (S). LHI indicates the position of the specimens examined from Lord Howe Island.

simplicifolium and generally has a larger corolla tube and calyx teeth than *J. volubile*.

Whilst not strictly observations on New Caledonian material, it is interesting to make two notes on allied material. The only specimen seen from the adjacent New Hebrides (*Kajewski 404*, A, NY) is *Jasminum leratii*. It was originally identified as *J. simplicifolium* (Guillaumin, Jour. Arn. Arb. 13: 17. 1932), but, although it has no corollas on it to examine and measure (being in fruit), in leaf dimensions and shape, and in calyx type, it falls into the range of *J. leratii*. The two specimens examined from Lord Howe Island in this investigation (*McCornish 4* [A] and "Phytologic Museum of Victoria, Government Botanist Melbourne" [E]) have leaves and calyx teeth which in length lie on the edge or outside the ranges of the Australian specimens of *J. volubile*. Yet in greatest leaf breadth factor and length of corolla tube they agree with the rest of the Australian material.

At the same time as *Jasminum leratii*, *J. volubile*, and *J. simplicifolium* were being investigated, the opportunity was taken to examine the cultivated species *J. absimile* L. H. Bailey, and a separate note about this will appear in *Baileya*. It is sufficient to point out here that *J. absimile* is conspecific with *J. leratii*, although in the former there are usually more flowers per inflorescence and the leaves are a little larger on the average. But both these differences can be accounted for by favorable conditions of growth in cultivation.

Jasminum leratii is very variable in leaf shape and size, and it is suspected that this may be a reflection of the habitat conditions under which the plants are growing. Some of the largest leaves (up to 7 cm.) are exhibited by a specimen of *Däniker 1909*; yet under this same number is a shoot with quite typical leaves half their size. *Däniker 1171* exhibits leaves which are consistently small and narrow. Because of this it was used as the type of both *J. daenikeri* and *J. neocaledonicum* var. *angustifolium*, but some of the leaves on *Le Rat 172*, the type of *J. leratii*, are an exact match, as are those of *Guillaumin & Baumann-Bodenheim 11663*, in which they range from broad-ovate to linear, although considerably larger than in *Le Rat 172*. Similarly, a small-leaved scrap (*Vieillard 2935*) was the basis of the published name *J. noumeense* var. *microphyllum* (although the type sheet at Paris bears only the name *J. neocaledonicum* var. *microphyllum* in Guillaumin's hand). The leaves are shorter than those of *Däniker 1171* but they can be matched exactly by the smallest leaves of several other specimens and in floral characters this specimen is identical with the rest of *J. leratii*.

Dr. Hürlimann has remarked in correspondence that it is uncommon for endemic species in New Caledonia to occur on calcareous as well as on serpentine soils, but using dried specimens I have been unable to discern any consistent differences between individuals from the two habitats. It is possible that there are differences which are masked in the herbarium by the limitations of the material and the wide variability of the species,

and an examination of populations in the field with this point in mind might well prove profitable.

Although Guillaumin described *Jasminum francii* in 1933, he placed it in synonymy the following year (see Bull. Mus. Hist. Nat. Paris II. 6: 458. 1934) after he had seen authentic material of Schlechter's species.

When describing *Jasminum kriegeri*, Guillaumin cited two numbers, one of which was *Vieillard 2938*; however, all the specimens of this number which I have seen, including one from Paris, are clearly *J. leratii*. This number is presumably a mixed gathering, for Guillaumin (in Bull. Mus. Hist. Nat. Paris II. 15: 453, 454. 1943) referred *Vieillard 2938* to both *J. kriegeri* and *J. leratii*, adding "*pro parte*" to the citation under the latter.

3. **Jasminum neocaledonicum** Schlechter, Bot. Jahrb. 39: 231. 1906; Guillaumin, Ann. Mus. Col. Marseille II. 9: 191. 1911, Not. Syst. Paris 3: 65. 1914, et Bull. Mus. Hist. Nat. Paris 25: 652. 1919, *ibid.* II. 2: 169. 1930; Däniker, Viert. Naturf. Ges. Zürich 78(Beibl. 19): 366. 1933; Guillaumin, Bull. Mus. Hist. Nat. Paris II. 13: 127, 1941, *ibid.* 20: 371. 1948, et Fl. Nouv.-Caléd. 284. 1948, et Bull. Mus. Hist. Nat. Paris II. 27: 475. 1955, *ibid.* 30: 397. 1958.

J. pulchrefoliatum Guillaumin, Not. Syst. Paris 3: 62, 65. 1914, et Bull. Mus. Hist. Nat. Paris 25: 500. 1919, et in Sarasin & Roux, Nova Caledonia, Bot. 1: 207. 1921, et Bull. Mus. Hist. Nat. Paris 27: 560. 1921, *ibid.* II. 4: 701. 1932; Däniker, Viert. Naturf. Ges. Zürich 78(Beibl. 19): 367. 1933; Guillaumin, Bull. Mus. Hist. Nat. Paris II. 10: 520. 1938, et Fl. Nouv.-Caléd. 284. 1948.

Evergreen liane; stem glabrous, even when young. *Leaves* opposite, simple; petioles 6–35 mm. long, glabrous, articulated ⅓–½ from the base, occasionally on the largest leaves an additional articulation toward the top; lamina broadly ovate to very broadly ovate, (4–)6–9.5(–11) cm. long by (3–)4–8.5(–10) cm. broad; margin entire, not noticeably thickened or recurved; apex acute or acuminate, more rarely obtuse or even retuse; base rounded, truncate or subcordate, only slightly attenuate into the petiole; venation more or less evident, especially above, primary nerves (4)5–7 per side. *Inflorescences* axillary and terminal on side shoots, ternately paniculate, (5–)7–50 flowered, glabrous; bracts more or less linear subulate, 2–7 mm. long; pedicels 3–10 mm. long. Flowers, white, fragrant, heterostylous. *Calyx* glabrous, tube 2–3 mm. long with 4–6 subulate-lanceolate teeth, 1–2.5 mm. long, often slightly recurved (FIG. 1 G). *Corolla* hypocrateriform, tube 20–22 mm. long, lobes 5–7, lanceolate, acute, about 13 mm. long. *Stamens* 2, anthers 4.75–5 mm. long on filaments 0.25–0.5 mm. long. *Ovary* 1.25–1.5 mm. long, style about 10 mm. long in short-styled flowers and 20 mm. long in long-styled. *Fruits* (one loose fruit only seen, *Baumann-Bodenheim 5881*), ellipsoid, 22 mm. long by 9 mm. broad.

New Caledonia. Bei Oubatche, in den waldern der Berge, c. 900 m. alt., 27 Dec. 1902, *Schlechter 15586* (holotype, B [destroyed, not seen]; isotypes, BM, E, K, Z); entre Bourail et Houailou, montagnes, c. 400 m. alt., 6 Feb. 1912, *Sarasin 525* (syntype *J. pulchrefoliatum*, P [photograph seen]; isosyntype, Z); Bourail, *Balansa 1299* (P); Prony, buissons du littorale, Jan. 1915, *Franc 1935* (P); road to Montagnes des Sources, 650 m. alt., 4 March 1955, *McKee 2198* (US); south of Mt. Kongouaouri, mesophilous forest on serpentine, 300 m. alt., 10 Sept. 1950, *Baumann-Bodenheim 5874, 5881* (A, Z); Mé Amméri, 700 m. alt., on serpentine soil, 28 Nov. 1950, *Guillaumin & Baumann-Bodenheim 8883* (Z); Mé Aoui, hygrophilous forest on schistaceous soil, 500 m. alt., 7 & 8 Feb. 1951, *Guillaumin & Baumann-Bodenheim 10301, 10440* (A, Z).

A handsome species with large leaves and usually numerous flowers to the inflorescence which must be very beautiful as a living plant. Vegetatively it is sometimes very similar to large-leaved examples of *Jasminum elatum*, but the two may easily be distinguished by their calyces and, to a limited extent, by the position of the petiolar articulation (see under *J. elatum*). To judge from some of the specimens examined, there is also a tendency for specimens of *J. neocaledonicum* to blacken on drying.

In his protologue for this species Schlechter cites his specimen no. *15585* but this must be a misprint, for *15586* is the number on all the Schlechter specimens examined, and, in the same publication (Bot. Jahrb. 39: 224. 1906), he cites no. *15585* as the type of another of his species: *Leucopogon septentrionalis*.

4. **Jasminum noumeense** Schlechter, Bot. Jahrb. 40(Beibl. 92): 33. 1908; Guillaumin, Ann. Mus. Col. Marseille II. 9: 191, 1911, et Not. Syst. Paris 3: 65. 1914, et Bull. Mus. Hist. Nat. Paris II. 6: 458. 1934, *ibid.* 10: 519. 1938, *ibid.* 15: 454. 1943, et Not. Syst. Paris 11: 55. 1943 (sphalm. *J. noumeanum*), et Fl. Nouv.-Caléd. 284. 1948, et Mém. Mus. Hist. Nat. Paris II(B). 4: 48. 1953, et Bull. Mus. Hist. Nat. Paris II. 27: 475. 1955.

   J. bouquetii Jeanneney, Nouv.-Caléd. Agricole 121. 1894, *nom. nud.*; Guillaumin, Not. Syst. Paris 11: 55. 1943, nom. pro syn.
   J. magentae Guillaumin, Bull. Mus. Hist. Nat. Paris II. 2: 169. 1930; *ibid.* 4: 697. 1932.

Evergreen liane of variable length; stem puberulent or occasionally glabrous. *Leaves* opposite, simple; petioles 3–17 mm. long, puberulent or occasionally glabrous, articulated near the base; lamina more or less chartaceous, ovate to very broadly ovate, (2–)3–5(–6) cm. long by (1.5–)2–3.5(–5) cm. broad; margin entire, not thickened, occasionally very slightly recurved; apex rounded to obtuse, or retuse, occasionally acute, often with an apiculus; base truncate or occasionally rounded or subcordate, only slightly attenuate into the petiole; venation with primary nerves usually visible, sometimes more or less obscure, 3–5 per side. *Inflorescences* terminal or axillary on side shoots, ternately subcorymbose-paniculate, with up to about 20 flowers per panicle, usually pubescent,

especially towards the base of the inflorescence, occasionally glabrous; bracts more or less foliaceous, especially the basal ones, and up to 2 cm. long, occasionally the upper ones ranging to subulate, 1–2 mm. long; pedicels 3–12 mm. long. Flowers white, fragrant, sometimes strongly so (*McKee 2728*) or inodorous (*Däniker 1846*), heterostylous. *Calyx* pubescent, occasionally glabrous, the tube 2–3(–4) mm. long, with 4 or 5 subfoliaceous teeth 2–5.5 mm. long, often wavy margined (FIG. 1,H), somewhat accrescent in fruit. *Corolla* hypocrateriform; tube 24–33 mm. long, lobes 5, lanceolate or broadly lanceolate, acute or very acute, 8.5–15 mm. long. *Stamens* 2; anthers (3–)4–5.5(–6) mm. long, on filaments 0.2–2 mm. long. *Ovary* 1–1.25 mm. long; style 10–11 mm. long in short-styled flowers or 20–30 mm. long in long-styled. *Fruits* (*Balansa 2232*, *Virot 842*) bilobed, united for about ⅔ length of each half, 8–9 mm. long by 7–8 mm. broad, occasionally single sided with a lateral projection 2–3 mm. in diameter representing the abortive loculus.

New Caledonia. Magenta (near Nouméa), June 1903, *Le Rat 574* (isosyntype, P) also, May 1903, *Le Rat 588* (isosyntype, P); bois de Port Despointes (Nouméa), ±50 m. alt., bois secs des collines littorale, schistes nummulitiques, 21 Nov. 1942, *Virot 842* (A); Port N'Gea (Nouméa), près du littorale, ±15 m. alt., bois secs des collines littorale, schistes nummulitiques, 26 Nov. 1942, *Virot 865* (A); Küstenhügel der Halbinsel Nouméa, in den Buschwäldchen am Abhang, 24 July 1925, *Däniker 1846* (Z); Nouméa, Aug. 1926, *Franc 2232* (holotype *J. magentae*, P; isotypes, A, NY, US); Nouméa, foot of Ouen Toro, just above beach, 6 July 1955, *McKee 2728* (A, HULL); Anse Vata, remnant of dry forest on low calcareous hill, 27 March 1955, *McKee 2298* (A, HULL, US). Without locality, *Franc 845* (A, BM, E, K, NY, P, US); *Vieillard 2936* (BM); *Pancher 315* (A) and *Pancher s.n.* (labeled *J. bouquetii*, A).

One of the most distinctive features of this species is the large, almost subfoliose, calyx lobes (FIG. 1,H). The corolla tube, too, is longer than in any other New Caledonian jasmine. Vegetatively it can be very similar to *Jasminum artense*; for vegetative characters which can be used to distinguish between them see under that species.

It was recognized as a distinct species as early as 1894 when, without description, Jeanneney used the name *Jasminum bouquetii*. In 1930, Guillaumin published his *J. magentae* with a short description in French, and two years later (in Bull. Mus. Hist. Nat. Paris II. 4: 697. 1932) he amplified the description and published it in Latin. Later (*ibid.* 6: 458. 1934), after having seen syntype material of Schlechter's species published in 1908, he placed it in synonymy under *J. noumeense*, where it undoubtedly belongs.

5. **Jasminum artense** Montrouzier, Mém. Acad. Lyon **10**: 231. 1860; Guillaumin, Ann. Mus. Col. Marseille II. **9**: 191. 1911, et Bull. Mus. Hist. Nat. Paris **18**: 468. 1912, et Not. Syst. Paris **3**: 61, 65. 1914; Guillaumin & Beauvisage, Ann. Soc. Bot. Lyon **38**: 102 ("Species Montrouzieranae," 28) 1914; Däniker, Viert. Naturf. Ges. Zürich **78**

(Beibl. 19): 365. 1933; Guillaumin, Fl. Nouv.-Caléd. 284. 1948, et Mém. Mus. Hist. Nat. Paris II(B). **8**: 161. 1959.

J. dzumacense Guillaumin, Not. Syst. Paris **3**: 63, 65. 1914; Däniker, Viert. Naturf. Ges. Zürich **78**(Beibl. 19): 366. 1933; Guillaumin, Fl. Nouv.-Caléd. 284. 1948, et Mém. Mus. Hist. Nat. Paris II(B). **4**: 47. 1953, *ibid.* **8**: 161. 1959.

J. velutinum Guillaumin, Mém. Mus. Hist. Nat. Paris II(B). **4**: 48. 1953, non Kobuski (1941); Virot, Vég. Canaque, 175. 1956.

Evergreen liane; stem glabrous or puberulent, rarely somewhat velutinous, especially when young. *Leaves* opposite, simple; petioles 3–20 mm. long, glabrous or puberulent, rarely velutinous, articulated ⅓–½ from the base, sometimes on larger leaves showing an additional articulation toward the top; lamina more or less coriaceous, glabrous or rarely puberulent, ovate to orbicular, rarely narrowly ovate, (1.2–)2–4.5(–5.5) cm. long by (1–)1.5–4(–5.2) cm. broad; margin entire, slightly thickened, usually recurved; apex rounded, obtuse or even retuse to acute, often with a small apiculus; base rounded or subcordate, rarely obtuse; venation with primary veins visible, sometimes obscure above, (2)3 or 4 per side, occasionally reticulate. *Inflorescences* axillary and terminal on side shoots, ternately paniculate, with 5–7(–15) flowers per panicle, glabrous or puberulent, rarely velutinous; bracts subulate, 1–1.5 (–3) mm. long; pedicels 5–20 mm. long. Flowers white, fragrant, heterostylous. *Calyx* glabrous or puberulent, rarely velutinous; tube 1.5–2.5 mm. long with 4 or 5 shallowly triangular teeth 0.1–0.7 mm. long (FIG. 1, C to D). *Corolla* hypocrateriform; tube 10–20 mm. long with 5–8 lanceolate or narrowly lanceolate, acute (to rounded) lobes 8–13 mm. long. *Stamens* 2; anthers 2.75–3.5 (–5) mm. long on filaments 0.5–1 mm. long. *Ovary* 1–1.25 mm. long; style about 7 mm. long in short-styled flowers or 9–17 mm. long in long-styled. *Fruit* (*Balansa 3629*) ovoid-ellipsoid, paired (or single by abortion) 10–11 mm. long by 7–8 mm. broad.

New Caledonia. Valleé du Diahot (Dothio), collines eruptive, Jan. 1872, *Balansa 3629* (syntype *J. dzumacense*, P; isosyntypes, BM, E, K); Mt. Dzumac, Jan. 1909, *Le Rat 165* (syntype, *J. dzumacense*, P); bords des creeks desechés, base des versants ouest du Mt. Kaala, ± 20 m. alt., maquis serpentineux, 10 Nov. 1943, *Virot 1302* (holotype *J. velutinum*, P); im Tale des vom Mt. Humboldt kommenden Zuflusses der Kalouéhola und an den Abhängen des Tontoutatales, im Serpentingebüsch, 18 Nov. 1924, *Däniker 483* (Z) and 10 Nov. 1924, *Däniker 588* (Z); am Mt. Bacon am äusseren Abhang des südlichen Serpentinmassivs gegen die Tontoutaebene, im Buschwalde, 15 Nov. 1924, *Däniker 700* (Z); Prony, 1890, *Bougier* (LY); Ile Art, in montanis et silvis, Sept. & March, *Montrouzier 143* (holotype, P); slope west of "Baie des Pirogues," on serpentine soil, 40 m. alt., 16 Dec. 1950. *Hürlimann 355* (A, Z), *ibid.*, meso-xerophilous shrubby forest on serpentine soil with rocks, 170 m. alt., 17 Dec. 1950, *Hürlimann 381* (A, Z); range of Mt. Podchoumié (Dumbéa), on rocky serpentine ridge, 180 m. alt., 23 July 1951, *Hürlmann 1625* (A, Z); Col de Plum (Mt. Dore), on serpentine soil, 200 m. alt., 22 Aug. 1950, *Baumann-Bodenheim 5577*, *5593A* (A, Z), *ibid.*, 8 Nov. 1950, *Guillaumin & Baumann-Bodenheim 7879*, *7933*

(A, Z); Col de Vulcain, serpentine bush, 900 m. alt., 11 Nov., 1950, *Baumann-Bodenheim 8178* (A, Z). ISLE OF PINES: south of Pic Nga, mesophilous forest on serpentine, 29 May 1951, *Baumann-Bodenheim 13699* (A, Z), and creek on the southwest slope of Pic Nga, mesophilous forest, 30 May 1951, *Baumann-Bodenheim 13786, 13789, 13816* (A, Z).

Jasminum artense is a distinct species which may perhaps be confused vegetatively with *J. noumeense*, but the leaves of the latter tend to be thinner in texture and the articulation of the petiole appears never to be more than 2 mm. from the base, even on the longer petioles. In *J. artense* the articulation is usually at least 2 mm. from the base, except in the case of very short petioles, where however, it is found at least between one-third and one-half of the way from the base of the petiole. When material bears an inflorescence there is no difficulty in distinguishing the two species, for the calyx lobes are quite distinct: in *J. artense* short and broadly triangular, in *J. noumeense* long and almost subfoliaceous.

Jasminum dzumacense was separated from *J. artense* on the relative lengths and positions of the style and stamens, but I cannot separate them as species in view of the frequency of heterostyly in the genus. In 1953, Guillaumin also distinguished and published the name of *J. velutinum*, but examination of the type (*Virot 1302*, not *1303* as cited in the protologue) shows that in everything but its velutinous indumentum the plant matches *J. artense*. Furthermore, *J. artense* has been found to be very variable in the amount of its pubescence, and *Virot 1302* is only the extreme expression of this character. Similar treatments of hairy variants as species have occurred in other species of *Jasminum*, e.g. *J. angulare*, *J. humile*, *J. subhumile*, and *J. floridum* (see Verdoorn, Bothalia 6: 560. 1956, and Green, Notes Bot. Gard. Edinb. 23: 355. 1961), and in each case an examination of more extensive collections than had been available earlier has shown that separation at specific rank cannot be justified.

In addition to the collections cited above, there is a specimen without sign of flowers or fruit (south slope of Ouen Toro, near Nouméa, on calcareous soil, 30 Oct. 1950, *Guillaumin 7414*, [A, Z]) which appears very similar to *Jasminum artense*. However it bears orbicular, retuse leaves which are especially small, varying from 0.8 cm. to 2 cm. in diameter, and was gathered from a plant growing on calcareous soil. All the specimens of *J. artense* of which there is mention of the soil type in their field notes are from serpentine soil and it would be interesting to see more material of this plant, especially flowering material.

6. **Jasminum linearifolium** Guillaumin, Mém. Mus. Hist. Nat. Paris II(B). 4: 47. 1953; Virot, Vég. Canaque, 175. 1956.

Evergreen liane of variable length or diffuse shrub; stems glabrous, slender. *Leaves* opposite, simple; petioles (2–)3–5 mm. long, glabrous, passing imperceptibly into the lamina, articulated at approximately the middle; lamina linear or very narrowly lanceolate, (3–)3.5–5(–7) cm. long by (0.1–)0.2–0.4(–0.6) cm. broad; margin entire, slightly thickened;

apex acute; base narrowly attenuate into the petiole; venation obscure above and below with 3 or 4 primary veins per side. *Inflorescences* terminal on side shoots, ternately branched with about 5 flowers per inflorescence, glabrous; bracts subulate, 0.5–2 mm. long; pedicels 5–10 mm. long. Flowers white. *Calyx* glabrous; tube 1–1.25 mm. long with 4 or 5 shallowly triangular teeth, 0.1–0.2 mm. long (FIG. 1, C). *Corolla* hypocrateriform; tube 16 mm. long with 4 narrowly lanceolate, acute or obtuse lobes 10 mm. long. *Stamens* 2; anthers 3.75 mm. long on filaments 2.5 mm. long. *Ovary* globose (fide Guillaumin); style 5 mm. long (fide Guillaumin) in a short-styled flower. *Fruit* unknown.

New Caledonia. Sommet du Dôme de la Tiébaghi, ±600 m. alt., maquis serpentineux, 27 Oct. 1943, *Virot 1275* (holotype, P).

The specimen upon which this species is based is unique amongst all the material examined in this investigation. However, one gathering of *Jasminum leratii* (*Guillaumin & Baumann-Bodenheim 11663*) bears some shoots and leaves which approach (and in their extreme match) in slenderness and narrowness the stem and leaves of *J. linearifolium*. But a glance at the calyx shows that this species is not immediately related to *J. leratii*. Rather is the relationship with *J. artense* and, in fact, except for the leaves, the two species are identical, and further collections may perhaps produce intermediates. Yet the difference between linear leaves and ovate or orbicular ones is so great that, for the present at least, it is felt best to maintain this species, based though it is, upon a single few-flowered specimen with only one corolla.

7. **Jasminum elatum** Pancher ex Guillaumin, Not. Syst. Paris **3**: 63, 65. 1914, et Bull. Mus. Hist. Nat. Paris II. 1: 217. 1929 et Candollea **5**: 151. 1932; Däniker, Viert. Naturf. Ges. Zürich **78**(Beibl. 19): 366. 1933; Guillaumin, Fl. Nouv.-Caléd. 284. 1948.

   J. elatum var. *brevistylis* Guillaumin, Not. Syst. Paris **3**: 64, 1914, et in Sarasin & Roux, Nova Caledonia, Bot. **1**: 207. 1921, et Bull. Mus. Hist. Nat. Paris II. **15**: 453. 1943.

Evergreen climbing shrub; stems glabrous or puberulent, often minutely so and especially when young. *Leaves* opposite, simple; petioles 3–22 mm. long, glabrous or puberulent, articulated near the base; lamina more or less chartaceous, narrowly ovate to broadly ovate, or even very broadly so, (2.5–)4–8(–10) cm. long by (1.2–)2–7(–7.5) cm. broad, margin entire, not usually recurved or noticeably thickened; apex obtuse or acute, or more rarely slightly retuse, often with an apiculus; base truncate, rounded, obtuse or cuneate, often more or less attenuate into the petiole and rarely almost subcordate; venation usually with primary nerves only visible above and below, 4–7 per side. *Inflorescences* axillary or terminal on side shoots, dense, ternately subcorymbose, many flowered, glabrous to densely and minutely puberulent; bracts subulate, narrowly oblanceolate or elliptic,

the lower ones subfoliaceous, 1–6 mm. long; pedicels short, 0–2 mm. long. Flowers white, fragrant, heterostylous. *Calyx* glabrous and ciliolate to densely and minutely puberulent; tube 1.5–2.5 mm. long with 4–6 stout, blunt, teeth 0.1–1 mm. long, which in the extreme are almost flattened laterally (FIG. 1, A & B, occasionally almost to C). *Corolla* hypocrateriform; tube 8–21 mm. long; lobes 4–6, broadly ovate or ovate, rounded or acute, 4–7.5 mm. long. *Stamens* 2; anthers (2.5–)3–4 mm. long on filaments 0.2–0.5 mm. long. *Ovary* 0.75–1.25 mm. long; style 3–6.5 mm. long in short-styled flowers or 12–22 mm. long in long-styled. *Fruit* (*Balansa 1298*) ovoid, paired (or single by abortion), 9–10 mm. long by 7–8 mm. broad.

New Caledonia. Environs de Nouméa, bosquets, Sept. 1868, *Balansa 578* (syntype, P; isosyntype, BM, NY); Port de France [=Nouméa], *Vieillard 907* (syntype var. *brevistylis*, P; isosyntypes, A, G); Kanala, *Vieillard 908* (syntype var. *brevistylis*, P); Mt. Canala, 650 m., Nov. 1911, *Sarasin 363* (Z); au Sûd de Canala, forêts, vers 1,000 m. alt., Nov. 1869, *Balansa 1702* (syntype var. *brevistylis*, P); près de Koe, bords de la Dumbéa, 14 Dec. 1869, *Balansa 1298* (syntype, P; isosyntype, K); bei La Foa an der Brücke über das Flüsschen La Foa, im Ufergebüsch, 27 Sept. 1924, *Däniker 131* (Z); Gatope, *Vieillard 2929* (BM, K); northwest slope of Mt. Mou, forest, 15 Oct. 1950, *Guillaumin & Baumann-Bodenheim 6958* (A, Z); Mé Amméri, on serpentine soil, 700 m. alt., 28 & 30 Nov. 1950, *Guillaumin & Baumann-Bodenheim 8770, 9066* (A, Z); above the "Ermitage" valley (Mt. Koghi), hygrophilous forest on serpentine, 400 m. alt., 4 July 1951, *Baumann-Bodenheim 14479* (A, Z); without locality, *Pancher 316* (=*Vieillard 2930*) (syntype var. *brevistylis*, P; isosyntype, BM), massifs sur les sols argilo-schisteux, March, *Pancher 313* (=*Vieillard 2941*) (lectotype, P).

Loyalty Islands. LIFOU: Képénéhé, im Buschwald in Küstennähe, 22 Oct. 1925, *Däniker 2270* (Z); Thosip, 10 Nov. 1925, *Däniker 2270a* (Z); without locality, *Deplanche 82* (syntype, P).

Jasminum elatum is distinguished amongst the simple-leaved New Caledonian species by its sessile or almost sessile flowers. The apparent "flatness" of the inflorescence branches and the size of the upper bracts are also distinctive. In length of calyx lobes it is similar to *J. artense*, but the lobes of the two species are nevertheless different: in *J. artense* they are flat, broadly triangular and acute, or at least with an angular apex, but in *J. elatum* they are blunt and thick, or even somewhat flattened laterally in those with the largest teeth. In addition, although the corolla tube in these two species is the same length, the lobes in *J. elatum* are shorter than those in *J. artense*. Large-leaved vegetative specimens of *J. elatum* may be confused with *J. neocaledonicum*, but in the former the petiolar articulation is usually found more or less towards the base and in the latter well up the petiole. Some purely vegetative specimens with large leaves can be difficult to identify and a good example is *Guillaumin & Baumann-Bodenheim 8732* (Mé Amméri, 700 m. alt., on serpentine soil, 28 Nov. 1950, Z) which is perhaps best left as "cf. *elato*."

With his original description Guillaumin cited five collections; it has

been decided to select as lectotype the specimen of *Pancher 313* at Paris: it is the only Pancher specimen amongst the syntypes, and on the label with the Paris specimen he has written "Jasminum elatum — de la hauteur de la tige."

8. **Jasminum promunturianum** Däniker, Viert. Naturf. Ges. Zürich 78(Beibl. 19): 367. 1933; Guillaumin, Bull. Mus. Hist. Nat. Paris II. 14: 456. 1942, *ibid.* 15: 454. 1943, *ibid.* 20: 371. 1948, et Fl. Nouv.-Caléd. 284. 1948.

Evergreen shrub; stem puberulent. *Leaves* opposite, simple; petioles 1–2 mm. long, puberulent, articulated at the top; lamina thickish, oblanceolate or narrowly oblanceolate, (1–)1.5–2.5 cm. long by (0.2–)0.4–0.6(–0.7) cm. broad; margin entire, strongly recurved; apex retuse; base very narrowly cuneate, attenuate to the petiole articulation; venation more or less obscure, especially above, with 2 or 3 primary nerves per side. *Inflorescences* terminal on side shoots, single flowered; peduncle 1–1.5 mm. long, glabrous. Flowers white, ? heterostylous. *Calyx* glabrous; tube 2–3 mm. long with 5 or 6 stout, blunt, ciliolate teeth, 0.6–1.1 mm. long (FIG. 1, A). *Corolla* hypocrateriform; tube 20 mm. long; lobes 5, broadly lanceolate, acute, 7 mm. long. *Stamens* 2; anthers 4.25 mm. long on filaments 0.25 mm. long. *Ovary* 1 mm. long; style 7 mm. long in a short-styled flower. *Fruit* unknown.

New Caledonia. Insel Art der Belepgruppe, an den Küste, niedrigen Gebüschen, felsiger und exponierter Nordoststeilhang, 8 May 1925, *Däniker 1681* (holotype, z).

Vegetatively this species, with its small oblanceolate leaves, is very distinct. However, the calyx is extremely similar to that of *Jasminum elatum*, which itself is quite distinct from the other New Caledonian species in this respect. The field notes which accompany the one and only specimen state that it was collected on a rocky and exposed steep northeast slope on the coast, and it seems possible that *J. promunturianum* is really only a habitat form of *J. elatum*. Field observations and additional material may prove that the two ought to be united, but, since as yet I have seen no intermediate material, it seems best to maintain them for the present as separate species.

9. **Jasminum kriegeri** Guillaumin, Bull. Mus. Hist. Nat. Paris II. 15: 453. 1943, et Fl. Nouv.-Caléd. 284. 1948.

Evergreen; stem glabrous. *Leaves* opposite, simple; petioles 6–12 mm. long, glabrous, articulated ⅓–½ from the base; lamina thickish, narrowly lanceolate, 3.5–5.5 cm. long by 0.6–1.2 cm. broad; margin entire, slightly thickened; apex obtuse or acute, subapiculate; base attenuate-obtuse, somewhat decurrent onto the petiole; venation clear and raised above and below, 2 (or 3) primary veins each side from near the base, the upper two

prominent, running the length of the lamina and anastomosing, joined by 3 or 4 (5) slightly less prominent, short veins per side from the midrib, occasionally 1 or 2 of these being prominent. *Inflorescences* terminal on side shoots, ternately corymbose-paniculate, 5–12 flowers per inflorescence, glabrous; bracts subulate, 1–2 mm. long; pedicels 8–12 mm. long. *Calyx* glabrous, tube 4.5–5 mm. long (at least in dried material with about 20 longitudinal raised lines), with 5 acute or obtuse teeth, shallowly triangular, 0.2–0.5 mm. long (FIG. 1, E). *Corolla* hypocrateriform; tube (10–)20 mm. long with 5 or 6 lanceolate, acute, or obtuse lobes 11–13 mm. long. *Stamens* 2; anthers 4.5 mm. long, subsessile. *Ovary* 1.25 mm. long; style 18 mm. long in the long-styled flower examined. *Fruit* unknown.

New Caledonia. Gatope, leg. M. Krieger, *Vieillard 2937* (lectotype, P).

Jasminum kriegeri, although based on a scrappy specimen collected in 1867 by an infantry lieutenant named Krieger, was not described until 1943, and, despite the many collections that have been made in New Caledonia during the last forty years, the original, rather poor gathering is still the only example of this species in the herbaria I have examined.

When describing *Jasminum kriegeri*, Guillaumin cited two specimens, *Vieillard 2937* and *2938*, but all the material of the latter that I have seen, including one from Paris, is undoubtedly *J. leratii*. The specimen of the former number at Paris, with the name written in Guillaumin's hand and collected by Krieger, is the only one which the original description fits, and it is therefore selected as the lectotype.

The calyx is perhaps the most noticeably distinct feature of this species. In none of the other species is the calyx tube normally longer than 3 mm. at the most, although rarely in *Jasminum noumeense* it reaches 4 mm. but with large subfoliaceous lobes on top. Usually in the New Caledonian jasmines it is only 1.5–2.5 mm. long, whereas in *J. kriegeri* it is 4.5–5 mm. in length and contrasts with the very small comparatively obscure teeth. The calyces on the dried specimen which constitutes the type are furrowed throughout their length by shallow grooves which presumably correspond to the spaces between the veins. They are never so noticeable in the other species, and it is suspected that they appear only on drying.

The other part of this specimen which is noticeably distinct is the leaves. In shape they are very similar to a narrow-leaved expression of *Jasminum leratii*, but the venation is more or less unique amongst the New Caledonian species. In several species the main lateral and basal nerve runs the length of the lamina near the margin and joins up with the other lateral nerves given off by the midrib, but in this species two prominent nerves run the length of the lamina and the nerves joining them are fewer in number and more obscure. Nevertheless, this difference is only one of degree, and within the genus a whole range can be found from a regularly pinnately nerved leaf to the extreme as exhibited, for example, by *J. crassifolium* Blume where the only two prominent lateral nerves run the length of the leaf, one on each side of the midrib.

None of the intact flowers on the type specimen are quite mature, and it is feared that the measurements of the corolla given in the description above may be too short, for, judging from specimens of other species, it is believed that the corolla tube, for example, lengthens right up to the time of anthesis. (Observations on living plants would perhaps settle this point.)

INDEX TO EXSICCATAE

The list is arranged alphabetically by the last name of the collector. Numbers in parentheses refer to the corresponding species in the text.

Bailey *9623* (2)
Balansa *578*, *1298* (7); *1299* (3); *1702* (7); *2785*, *3189* (1); *3629* (5)
Baumann-Bodenheim *5032* (1); *5577*, *5593A* (5); *5874*, *5881* (3); *6057* (1); *8178* (5); *8285* (2); *13436*, *13454*, *13608* (1); *13642* (2); *13699*, *13786*, *13789*, *13816* (5); *14479* (7); *14529*, *14721* (2); *14770* (1)
Bougier *s.n.* (5)
Brousmiche *577* (1)
Compton, *455* (1)
Däniker *131* (7); *483*, *588*, *700* (5); *770*, *770a*, *1171*, *1333*, *1335* (2); *1436* (1); *1518*, *1599* (2); *1681* (8); *1717* (1); *1846* (4); *1886*, *1909*, *2269* (2); *2270*, *2270a* (7); *2388*, *2388a* (2); *2465*, *2465a* (1); *2626*, *3088*, *3089* (2)
Deplanche *82* (7)
Eastwood, *s.n.* (2)
Franc *845* (4); *1021* (2); *1377* (1); *1544*, *1544A* (2); *1906* (2); *1935* (3); *2232* (4); *2313* (1)
Germain *13* (2)
Guillaumin *7414* (under 5); *13395* (1)
Guillaumin & Baumann-Bodenheim *6842* (1); *6958* (7); *7879*, *7933* (5); *8732* (under 7); *8770* (7); *8883* (3); *9066* (7); *9514*, *9665* (2); *10301*, *10440* (3); *11106*, *11135*, *11161*, *11663*, *12403* (2); *13127* (1)
Heim *49* (2); *74* (1)
Hürlimann *355*, *381* (5); *769* (2); *1092*, *1166* (1); *1290* (2); *1307* (1); *1625* (5)
Le Rat *109* (1); *165* (5); *172* (2); *574*, *588* (4)
McKee *475*, *1973* (2); *2198* (3); *2251* (2); *2298* (4); *2342* (2); *2428* (1); *2728* (4); *6512* (1)
Montrouzier *143* (5)
Pancher *313* (7); *315* (4); *316* (7); *s.n.* (4)
Sarasin *185* (2); *363* (7); *424* (2); *525* (3); *730* (1); *885* (2); *890* (1)
Schlechter *15586* (3)
Vieillard *907*, *908* (7); *911* (2); *913* (1); *2929*, *2930* (7); *2935* (1); *2935* (2); *2936* (1); *2936* (4); *2937* (9); *2938* (2); *2941* (7)
Virot *442* (2); *842* (4); *846* (1); *865* (4); *876*, *881* (2); *882* (1); *922*, *927*, *929* (2); *1275* (6); *1302* (5)
Walter *65* (2)
Woodcock *630* (2)